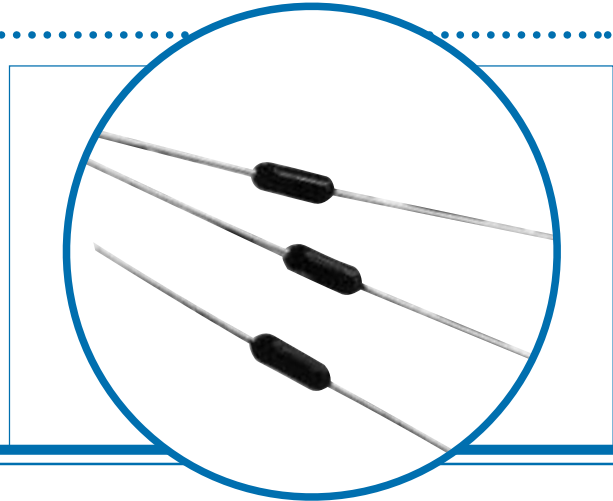


# Nickel Film Temperature Sensor

TD4

- Good long term stability
- Rugged construction
- Extremely economic solution



## Electrical Data

TD4		Actual		
Temperature range	°C	-55 to 155		
Resistance Range	ohms	20R to 1K		
Alpha	R <sub>25</sub> = 100 ohms	6000		
	R <sub>25</sub> = 1000 ohms	5850		
Standard value	ohms	100		
Tolerance	@25°C	±1.0	±2.0	±4.0
	Tolerance Codes	D	F	G
Interchangeability	@25°C	1.0	2.0	4.0
	@100	2.6	3.8	6.1
Self Heating (in air)	mW/°C	0.12		
Recommended measuring current	mA	1		
Time constant (time to reach 50% of 10°C, in stirred water)	secs	0.4		
Insulation resistance	ohms	>1G		

Note: Product can be calibrated at the factory, at extra cost

## Resistance vs Temperature

Resistance ohms	Temperature °C	Resistance ohms	Temperature °C
66.6	-50	118.1	60
70.6	-40	123.6	70
74.8	-30	129.2	80
79.1	-20	135.0	90
83.5	-10	140.9	100
88.0	0	146.9	110
92.7	10	153.0	120
97.5	20	159.3	130
100	25	165.7	140
102.5	30	172.2	150
107.6	40		
112.8	50		

Resistance v temperature for 100Ω sensor

## Definitions

$$R = R_0 (1 + At + Bt^2)$$

$$a = \frac{10000 (R_0 - R_{100})}{R_0 \text{ (ppm/°C)}}$$

R<sub>0</sub> : Resistance at 0°C  
R<sub>100</sub> : Resistance at 100°C  
t : Temperature

Constants:

$$A = 0.005247$$

$$B = 0.00000753$$

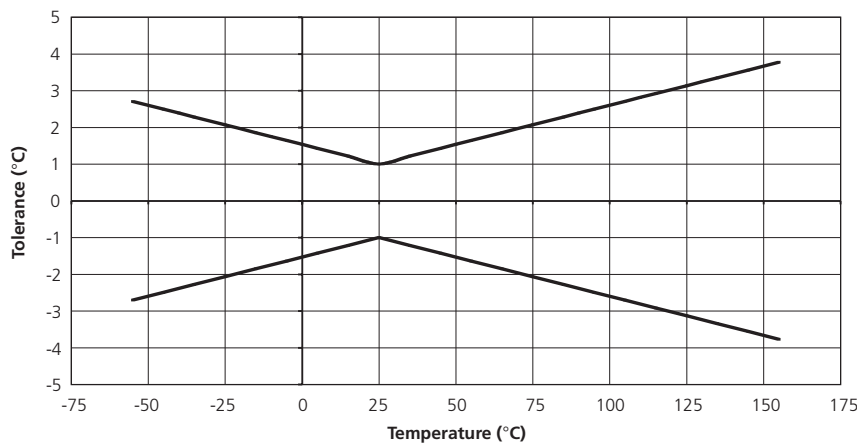
$$R_0 = 88.0$$

### General Note

Welwyn Components reserves the right to make changes in product specification without notice or liability. All information is subject to Welwyn's own data and is considered accurate at time of going to print.

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TD4 tolerance vs temperature

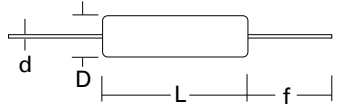


### Performance Data for R0 = 100ohms

			Actual Performance
Long term stability (1000hrs @ 155°C)	Resistance @ 25°C	%	0.18
	Equivalent to	°C	0.4
Thermal shock (10 cycles -55°C to 155°C)	Resistance @ 25°C	%	0.02
	Equivalent to	°C	0.04

### Physical Data

Dimensions (mm) & Weight (g)							
	L max	D max	f min	d nom	PCB mounting centre	Min Bend Radius	Wt. nom
<b>TD4</b>	7.2	2.5	30	0.6	10.2	0.6	0.24



#### Construction

A nickel film is deposited onto a high quality ceramic rod.

Nickel-plated steel caps are force fitted to the rod and termination wires are welded to the caps.

A laser is used to adjust the resistance value of the sensor by cutting a helix into the film. The body is protected with a high purity organic coating.

#### Terminations

<b>Material</b>	Solder-coated copper wire
<b>Strength</b>	The terminations meet the requirements of IEC 68.2.21
<b>Solderability</b>	The terminations meet the requirements of IEC115-1 Clause 4.17.3.2

#### Marking

TD4: Type reference, resistance and tolerance code.

#### Packaging

The standard packaging is in boxes. Taped sensors (on reel or in ammo pack) can also be supplied by special request.

#### Standard Quantities Per Package

Type	TD4
Small box	250
Large box	1,000
Reel	5,000
Ammo pack	1,000